Why Aren't My Picture and Sound In Sync?

The Coming Crisis in Technical Knowledge

by Eric Wenocur

The Way It Was, The Way It's Headed

Things have really changed in the video business. When I began working in post-production, some twenty years ago, it was not possible to do anything with television outside of a specialized facility--be it a broadcast station, studio or post house. The equipment was extraordinarily complex and expensive, so it needed to be concentrated in places with the financial and technical resources to make it usable. Clients paid a high price, but it was the only way to get something done--and it was generally expected that the final product would meet prevailing industry standards for both creative and technical quality.

These facilities were staffed with experts--creatives with a technical bent or gearheads with a tolerance for creatives--who signed on because of their interest in making television (or in playing with equipment). Either way, operators tended to pass through a loose kind of apprenticeship system: Start as a dub technician, move to assistant editor, move on to editor; start as a film splicer, learn the ropes of telecine transfers; start as an audio assistant and learn to record and mix; start as a camera assistant (or lower), move to camera operator... Whatever route was taken, generally by the time a person was working on actual jobs they had learned a huge amount about the technical side of the business. If nothing else, they could tell when something was wrong!

In my case, I was an electronics hobbyist as a kid, got into audio recording after high school, and started as a junior engineer at a video post house (when we still had flatbed film tables in the back room). By the time I went out on my own as a consulting engineer I'd seen a pretty wide range of technology. And, let's face it, video was almost fiendishly complicated at times--synchronization, color-framing, 3:2 pulldown, timecode, genlock, timing issues, scopes, levels... Television has never been simple, and dramatic advances in technology, from the 1950s on, have only made it more complex.

Enter the 1990s and the advent of computer-based storage and editing of audio and video. Digital formats and non-linear editing have revolutionized the industry in a mere 10 years, give or take. Production has moved rapidly toward a model in which "content" comes in the form of digital files, and can be manipulated by software on a computer rather than big and expensive hardware boxes. Digital technology has made sophisticated capture and post-production available to just about everyone--a commodity product that no longer requires a facility with highly skilled (and paid) operators.

Unfortunately, most of the technical issues that were part video production since the beginning are still here. Regardless of whether you are making a Hollywood feature, a community access program or a corporate training video, there are complex technical processes at work that will affect the final outcome of the production. If you are delivering over the airwaves there are specifications that must be met for legal transmission. Cable and satellite delivery don't really

change this, since all distribution systems have limits on what signals they can handle without distortion. VHS tape, once the lowest possible common denominator of video delivery, is being replaced by DVD but isn't gone yet (plus DVDs bring in a whole new range of technical issues that never existed before). Even webcasting, primitive as it is today, has the capacity to be better or worse depending on the technical savvy of the operator.

Today anyone can buy a DV camcorder and a copy of Final Cut and call themselves a filmmaker. And as long as they make shows for their own amusement it will *mostly* function as described in the manual. But working in any professional environment, high-end or low, means working at the crossroads of old technologies which are not gone, and new technologies that are in constant flux (this is particularly true for archivists).

What I'm Afraid I See

As production technology has become more digital, cheap and accessible, quantity has increased but standards have begun to fall. This phenomenon manifests itself in many ways: The definition of "broadcast quality" has now come to include almost anything that someone is willing to pay to watch; a push to create content more and more cheaply (particularly since so many costs actually *have* dropped); greater potential for technical flaws in productions of all kinds; the appearance of countless production personnel who claim to be professionals but have no industry background (or are being asked to do work for which they are not really qualified).

When I started in audio recording, it was a matter of professional pride that your master tape had the proper tones at the head and was wound tails out. You knew how to put on the tones, and you knew WHY they were there. Very few people are still using open-reel tapes of any kind these days (except at the high-end of music recording and in archives) but audio tones are still important! What I see now, all too often, are tapes with no tones at all, or tones that don't relate to the content. The same is true for colorbars in the video. Unfortunately, many people turning out tapes these days don't know much about bars and tone. They don't know much about levels or reading scopes and meters. They don't know much about timecode, lip-sync, distortion, video noise, compression, tracking, tape interchange, signal formats, tape formats or myriad other technical issues that **are** part of what they do.

I know of "editors" that cannot read a vectorscope or adjust a color monitor, don't really know how to use an audio mixer, and cannot tell if their equipment is patched correctly. Deeper operational issues, like setting menus in a VTR, are entirely out of the question, never mind the simplest of engineering tasks (such as knowing if your video monitor is terminated). Granted, there is still a line that divides operators from engineers, but the technical skills of new operators seem to be dropping.

Proponents of cheap video technology like to slam the old industry approach; calling it "elitism" because only a select few got to use the fancy equipment. I suppose this appears true because more people now have access to equipment with which to explore their talents. But the old environment, of facilities with concentrated resources, engendered a level of professionalism that helped maintain standards of quality. When technology becomes a commodity product, rather than a specialized one, there is no longer a "front line" of highly skilled people keeping

an eye on things. There was never any intentional elitism; some people were simply better able, and willing, to work with the technology that was in use at the time.

My sense today is that the availability of "desktop video" is creating a new generation of operators that fancy themselves experts without even realizing how much they don't know! My concern is that too many people are losing touch with the underlying knowledge and techniques that are necessary for *all* levels of production in film, video and audio. This is not a problem of excessive creative freedom, but one of technical ignorance brought about by easy and cheap access.

In addition, there seems to be a loss of interest in self-education. Many operators that work(ed) at facilities had to spend time seeking out the knowledge they needed, and practicing their craft, in order to get or hold their job. I see fewer new entrants willing to sit down and learn the basics, or even ask questions--in a job market that seems to value youthful exuberance, and low rates, over experience. At this point, even the people doing the hiring may not realize that they can no longer take technical knowledge for granted.

Talking Tech

I'm sure some readers raised an eyebrow when I suggested that some operators might not be "qualifed" for a particular job. Who says so? Certainly qualifications for any type of job are often fluid, sometimes clearly delineated and sometimes a matter of experience or even temperament. But I'm here to tell you that television, or film or audio, is a technologically complex endeavor; there are reasons why equipment works the way it does, and reasons why some people turn out a better end-product, with less struggle, than others. The engineers who design equipment understand the rules of electronic technology and they (generally) know the conditions under which equipment is being used. The people that create technical standards (the FCC, SMPTE, AES and the like) do so because it is necessary to define how a technology will work in order to promote quality and broad usefulness. These are not just whims, and it is worth recognizing that there **is** a technical framework within which we all operate. Even ground-breaking technologies must function within some existing context.

Let's divide technical knowledge into two general types: Standards and specifications that affect production quality, and basic understanding of practices that allow an operator to accomplish a task. Both of these areas affect the look, sound and cost of any production--whether a Hollywood feature or a corporate webcast--to a greater or lesser degree. As you move higher up the production food chain, necessary knowledge is likely to become more esoteric. Shooting single-camera DV with the onboard mic will present fewer issues than shooting multi-camera hi-def with double-system sound, but both are subject to the laws of physics and to the technical underpinnings that evolved as technologies developed.

In other words, a specification like "frame rate" is common to all video (and film) formats. If you shoot with a single camera and watch it on an appropriate monitor, you can probably ignore the issue. But the minute you introduce any kind of speed manipulation, separate sound recording, or multiple cameras, suddenly you may need to know a LOT about frame rates. If you need to work in more than one video standard (NTSC, PAL, Secam) frame rates take on a new meaning. If you start working with hi-definition video, or 24 fps standard def, frame rates

become even more of an issue. Shoot on film, transfer to HD, edit non-linear, output to tape as standard def and also conform a film negative to the EDL...

Obviously this can go on and on, but my point is that technical knowledge, of both standards and practices, are a part of every production to some extent. These issues are inescapable, and anyone who aspires to work with this technology should have some basic grounding in what makes video and audio tick, how to judge its quality, and how to use the equipment that makes it all possible. For the most part, professional equipment was designed by smart people with a good idea of how things are supposed to work, but you cannot rely entirely upon them to make your production a success (particularly when many devices from many manufacturers must work together).

Industry magazines, advertising and catalogs can be good sources of ideas, but are often lacking in reliable technical information; concepts and products are thrown out there to anyone interested with little regard for the big picture of technical context, viability or appropriateness. Nor can you rely on the people who sell equipment, as often they know very little about the theory or operation of what they are selling (and they have a vested interest in making sales). I believe there are college and university programs that include some amount of technical background in their curriculums for communications, multimedia, journalism and other disciplines, but there are plenty that provide little or no technical knowledge.

Today's software-based orientation to many production tasks has given rise to an assortment of training and "certification" programs which teach how to use the software but provide little, if any, background in how that software integrates with the rest of a production system. Terms such as multimedia, digital media, digital transition or digital artist are the new educational buzzwords that attract those interested in today's creative pursuits. Certain "multimedia" concepts, such as internet programming, really can be taught in a relatively isolated, software-only environment. This is because web pages exist only as software on computers connected to the internet. But I am highly suspicious of any program that claims to teach expert-level courses on Avid, Final Cut, Pro Tools or other products without also covering signals, image and sound quality evaluation, historical background, equipment operation and other topics not actually addressed in the software itself.

Not that these programs are worthless, just that they exist partly to address a true need, and partly because they are easy to organize and teach. A class in software operation, which requires very little specialized equipment or knowledge outside of the particular product, is a great business idea. Students get some training and the overhead is minimal. What students may not get is much awareness of technical context or real-world conditions and issues. For experienced professionals who want to hone their skills this is fine. But for a true neophyte this kind of training can leave students feeling that they know what they need to know, while in fact they have only learned a small portion of what they will eventually need. In any case, even the best training can only produce a "beginner" until they learn through experience--hopefully in an environment with more experienced people around.

Where Is This Going?

A friend of mine is an accomplished engineer who has worked on numerous Olympic broadcasts for the major TV networks. He recently mentioned that many of the "old-timers" who have been doing Olympics for decades are becoming less interested in signing on every two years. Unfortunately, there are also fewer young people coming up through the ranks (particularly in engineering) and fewer opportunities for them to get the kind of sophisticated knowledge required for a venture like Olympic coverage. He is afraid of a knowledge vacuum developing, and is not sure how this can be solved (other than handing more responsibility to the remaining experienced people).

Who will maintain the continuity of knowledge between experienced pros and newcomers? Much of the nuts and bolts of industry standards and practices have traditionally been learned on the job. With the reduction, or even disappearance, of the old "apprenticeship" process in many parts of the industry, it is up to operators to find out what they need to know and equip themselves accordingly. It is up to management to hire **experienced** people and recognize that they have an opportunity, a responsibility, to pass on what they know as newbies enter the workforce.

I don't believe that most of the public knows, or cares, about maintaining standards of quality in picture and sound. They often cannot tell when the quality is bad, and have no idea how much trouble goes into producing high quality content. So why bother? I guess the answer is because, in the long run, attention to quality at every stage does make itself known in subtle ways. And also for the basic satisfaction of actually recognizing good and bad, knowing how to make the best of what is available, and sharing a common understanding of how things are supposed to work. This is the realm of the professional.